

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Sujit Sharan and Gurtej S. Sandhu

Serial No.:

Filed: April 3, 2001

For: METHOD FOR PECVD DEPOSITION OF SELECTED
MATERIAL FILMS

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§ Group Art Unit:
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§ Examiner:
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§ Atty. Docket: 95-0716.03
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PRELIMINARY AMENDMENT

Commissioner for Patents

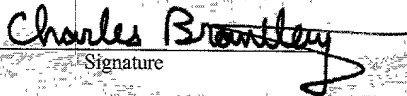
Washington, D.C. 20231

Dear Sir:

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I HEREBY CERTIFY THAT THIS PAPER IS BEING DEPOSITED WITH THE
UNITED STATES POSTAL SERVICE "EXPRESS MAIL POST OFFICE TO
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PATENTS, WASHINGTON, D.C. 20231.


Signature

After awarding the above-captioned application the benefit of the priority date of its parent -
- application 09/249,478, filed February 12, 1999-- please amend the current application as
follows.

IN THE SPECIFICATION:

Immediately after the title, please add the following: --

Related Application

[0000] This application is a continuation of application serial number 09/249,478, filed February
12, 1999. --

IN THE CLAIMS:

Please cancel claims 5-28 and 30-66 without prejudice.

Please amend the following claims to the state indicated below.

1. (Once amended) A process of PECVD deposition of metal films comprising the steps of:
providing an ion promoting atmosphere; and
contacting a substrate with a plasma of approximately 50 to 90 % of a metal-
containing gas in said ion promoting atmosphere at a pressure and temperature
range sufficient for film deposition for said metal.

29. (Once amended) A process for PECVD deposition of metal-containing films on a surface,
the process comprising:

maintaining a pressure and a temperature which allow for PECVD metal-containing
film deposition; and
contacting said surface with a plasma of approximately 50 to 90% metal-
containing compound in a chemically inert atmosphere.

A marked-up version of these amended claims appears in an appendix to this Preliminary
Amendment.

REMARKS

Claims 1-66 are part of the original specification.

Claims 5-28 and 30-66 are cancelled without prejudice.

Claims 1 and 29 are amended.

Claims 1-4, and 29 are pending.

Applicants note that the specification of this continuation has been altered from that of the
parent by providing paragraph numbering and by fixing a typographical error in the title as it
appears on page 1, after the cover page.

In the interest of efficient prosecution, Applicants also note that claims 1-4 and 29 were
prosecuted in the parent application and rejected in an Office Action dated February 9, 2001

(provided in an appendix for the Examiner's convenience). Applicants herein respond to those rejections.

I. Rejection of claims under §112.

The Examiner rejected claims 1-4 and 29 based on their use of the term "effective." Applicants have amended independent claims 1 and 29 to remove the term "effective." Dependent claims 2-4 benefit accordingly.

II. Rejection of claims based on double patenting.

The Examiner rejected claims 1-4 and 29 under double patenting in light of U.S. Patent 5,946,594. Applicants contend that the claims are non-obvious in light of '594. For instance, claim 1 requires "contacting a substrate with a plasma of approximately 50 to 90 % of a metal-containing gas." (Emphasis added.) Similarly, claim 29 requires contacting a surface with "a plasma of approximately 50 to 90% metal-containing compound." (Emphasis added.) '594 on the other hand teaches plasma formed from a hydrocarbon gas and TiCl_4 gas, wherein the flow rate of the hydrocarbon gas "should be four to about 1,000 times that for the TiCl_4 ." ('594 at col. 4, ln. 1-2.) Applicants assert that such a relatively large flow rate for the hydrocarbon gas would not result in claim 1's plasma of approximately 50 to 90 % of a metal-containing gas or claim 29's plasma of approximately 50 to 90% metal-containing compound. In fact, Applicants contend that '594's teachings actually teach away from such limitations, thereby rendering the claims non-obvious.

III. Comments on the Statement of Reasons for Allowance.

The Examiner of the parent application indicated that, if a terminal disclaimer were to be filed for the benefit of claims 1-4 and 29, they would be allowable. In support of the claims' potential allowability, the Examiner proceeded to recite limitations that did not coincide with the scope of the subject matter defined by the language of the claims. Accordingly, Applicants

request that the Examiner reject the comments presented in the Office Action dated February 9, 2001, and express that claims all pending claims are allowable based on the fact that the prior art fails to disclose the combination of limitations recited in those claims.

Conclusion

Based on the amendments and remarks above, Applicants contend that the pending claims are in condition for allowance. If there are any matters which may be resolved or clarified through a telephone interview, the Examiner is requested to contact Applicants' undersigned attorney at the number indicated.

Respectfully submitted,

Date: 4/2/1

Charles Brantley II
Charles B. Brantley II
Reg. No. 38,086
Micron Technology, Inc.
8000 S. Federal Way
Boise, ID 83716-9632
(208) 368-4557
ATTORNEY FOR APPLICANTS

Appendix I
Marked-up amended claims

1. (Once amended) A process of PECVD deposition of metal films comprising the steps of:
 - providing an ion promoting atmosphere; and
 - contacting a substrate with a plasma of approximately 50 to 90 % of a metal-containing gas in said ion promoting atmosphere at a pressure and temperature range sufficient for [effective] film deposition for said metal.

29. (Once amended) A process for PECVD deposition of metal-containing films on a surface, the process comprising:
 - maintaining a pressure and a temperature which [are effective] allow for PECVD metal-containing film deposition; and
 - contacting said surface with a plasma of approximately 50 to 90% metal-containing compound in a chemically inert atmosphere.

Appendix II
Office Action dated February 9, 2001

Office Action Summary

Application No.

09/249,478

Applicant(s)

SHARAN ET AL.

Examiner

Lisa A Kilday

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 19-21, 27 and 29-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 19-21, 27 and 29-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-4, 27, 29, are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. The term "effective" in claim 1, 27, and 29 is a relative term which renders the claim indefinite. The term "effective" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term "effective" is vague and not well known in the art.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Art Unit: 2813

4. Claims 1-12, 19-21, 27, 29-34 are rejected under the judicially created doctrine of double patenting over claims 1-28 of U. S. Patent No. 5,946,594 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

5. The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows: a process of PECVD deposition of metal films such as gaseous TiCl_4 and a chemically inert reactive species gas within the reactor to deposit a titanium containing film on a semiconductor wafer.

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6. Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

Allowable Subject Matter

7. The following is an examiner's statement of reasons for allowance: prior art does not teach or suggest a process for PECVD deposition by placing the chamber under vacuum pressure, combining a precursor deposition gas and a chemically inert reactive species producer gas, and generating a plasma from this gas in order to deposit a layer of metal on the substrate.

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8. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

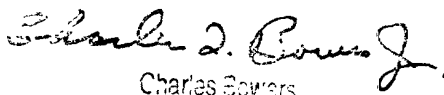
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Conclusion

Any inquiry concerning this communication from the examiner should be directed to Lisa Kilday whose telephone number is (703) 306-5728. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Bowers, can be reached on (703) 308-2417. The fax phone number for the group is (703) 305-3432.

LAK

02/02/01


Charles Bowers
Supervisory Patent Examiner
Technology Center 2300